

REMARKS / DISCUSSION OF ISSUES

Claims 1-10 are pending in the application.

The applicants thank the Examiner for identifying typographical errors in the claims.

The claims are amended for non-statutory reasons, to correct these errors and other informalities. The claims are not narrowed in scope and no new matter is added. Entry after final action is proper because the scope of the claims is not changed and no further searching is required.

The Office action rejects claim 9 under 35 U.S.C. 112, second paragraph. The applicants respectfully traverse this rejection. The Office action states that "it is unclear how forming a volume of digital data differs from acquiring a volume of digital data.

Claim 9 recites means for forming the volume of 3D digital data representing an environment including the object of interest; this is the 3D digital data that is 'acquired' in claim 1. Such a means generally includes, for example, a 3D imaging system that scans a portion of a body and converts the received signals into entries in a data structure that is used to represent volumetric data. This data may subsequently be stored on a computer readable medium, and 'acquired' by a system that is configured to process this volume of 3D digital data. The applicants note that a dependent claim to this particular form of an embodiment does not exclude other forms of embodiments of the invention of claim 1, including, for example, an integrated system wherein acquiring the volume data includes forming the volume data.

The applicants maintain that claim 9 clearly points out the subject matter that the inventor regards as the invention, and respectfully request the Examiner's reconsideration of the rejection of claim 9 under 35 U.S.C. 112, second paragraph.

The Office action rejects claim 10 under 35 U.S.C. 101. The applicants respectfully traverse this rejection.

The Office action asserts that claim 10 does not provide a useful, concrete, and tangible result. The applicants respectfully disagree with this assertion; but, in the interest of advancing prosecution in this case, claim 10 is amended to recite that the claimed method is configured for use in an imaging system.

The applicants respectfully maintain that claim 10 includes statutory subject matter, and respectfully request the Examiner's reconsideration of the rejection of claim 10 under 35 U.S.C. 101.

The Office action rejects claims 1-10 under 35 U.S.C. 102(b) over Demonceau et al. (USP 6,389,310, hereinafter Demonceau). The applicants respectfully traverse this rejection.

MPEP 2131 states:

"A claim is anticipated only if *each and every element* as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)... "The *identical invention* must be shown in as *complete detail* as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Demonceau fails to teach segmenting a region of interest comprising an object of interest, determining a sub-regions map within the segmented region of interest, and correcting the segmented region of interest using the sub-regions map, as specifically claimed in claim 1, upon which claims 2-7 and 9 depend.

In like manner, Demonceau fails to teach calculating a sub-regions map within a segmented region and excluding sub-regions of the segmented region based on the sub-regions map, as specifically claimed in claims 8 and 10.

Demonceau teaches segmenting an image into segmented regions of interest (distinguishing the Aorta descendens (AoD), Spleen (Spl), Left Ventricle (LV), Right Ventricle (RV), Left Auricle (LA), Right Auricle (RA) and other objects, including the Valvular Plane (VP) and Septum (SP) (Demonceau's Stage 3: Determination of the Position of the Heart Cavities and of the Valvular Plane and the Septum; column 19,

line 63 – column 24, line 57). As Demonceau states: "Knowing the valvular plane and the septum, the program determines the region of interest, i.e. one or more regions selected among LV, RV, LA, RA." (Demonceau, column 24, lines 55-57). Demonceau does not teach subsequently finding sub-regions with a segmented region of interest, as claimed by the applicants.

The Office action asserts that any of the determined regions can be considered a sub-region. The applicants respectfully disagree with this assertion. As is clearly claimed, a sub-region is determined as a region **within** a region of interest that is segmented from the volume of data. Demonceau does not teach determining sub-regions within a determined region. That is, Demonceau does not teach, for example, determining a region corresponding to the heart from the volume data, and then determining the cavities of the heart as sub-regions within the segmented region corresponding to the heart. Demonceau determines the cavities of the heart directly by segmenting the volume data directly into a corresponding region of interest for each cavity (LV, RV, LA, RA); these regions are not **within** any other determined region of interest, and cannot be said to be sub-regions, as the term is defined in the applicants' claims.

Further, Demonceau fails to teach correcting a region based on the map of sub-regions within this region, and does not teach excluding a sub-region within a region based on the map of sub-regions within the region, as also claimed by the applicants. The Office action fails to identify where Demonceau teaches correcting a region based on a map of sub-regions within the region, and asserts that Demonceau teaches excluding sub-regions from a region of interest at column 28, lines 30-50). The applicants respectfully disagree with this assertion. At the cited text, Demonceau teaches isolating one or more particular regions of interest, by excluding regions that are not of interest in the particular analysis. None of these regions are sub-regions of the other regions.

As noted above, Demonceau determines all of the regions of interest directly from the volumetric data. At the cited text, Demonceau teaches isolating the ventricles:

"Next, all 4D segments (as determined in Stage 9 ["Segmentation of the **Whole Matrix**"]) whose roots fall within a mask region, are selected as either left ventricular (LV) or right ventricular (RV), according to the value of the mask. This mask is computed in following way.

From the 3D input image corresponding with the time bin where the ventricles are the most visible--namely ED--the part corresponding with the ROI of the AoD, Spl, RA, and LA are removed." (Demonceau, column 28, lines 26-33).

As is clearly evident, the removed regions, AoD, Spl, RA, and LA, are not "sub-regions" of the regions of interest, RV and LV, and cannot be said to correspond to sub-regions that are eliminated, as asserted in the Office action, and specifically cannot be said to be sub-regions that are eliminated based on a map of these regions **within the segmented region** of interest, as specifically claimed in each of claims 8 and 10.

Because each of Demonceau's determined regions are distinct, and not sub-regions **within** a determined region, and because Demonceau does not teach correcting a region based on a map of sub-regions within the region, and does not teach excluding a sub-region within a region based on a map of the sub-region within the region, as specifically claimed, the applicants respectfully maintain that the rejection of claims 1-10 under 35 U.S.C. 102(b) over Demonceau is unfounded, per MPEP 2131, and should be withdrawn.

In view of the foregoing, the applicants respectfully request that the Examiner withdraw the objection(s) and/or rejection(s) of record, allow all the pending claims, and find the application to be in condition for allowance. If any points remain in issue that may best be resolved through a personal or telephonic interview, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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